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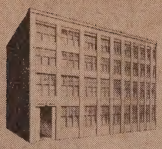

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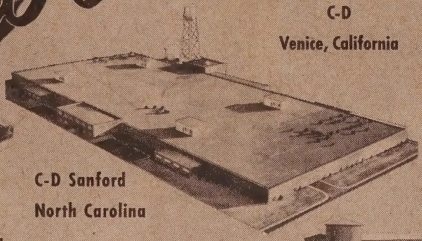

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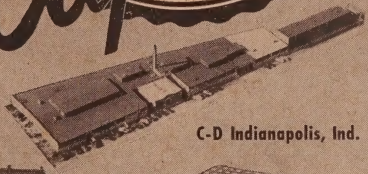

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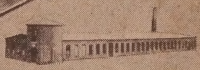

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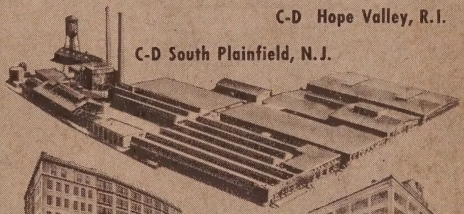

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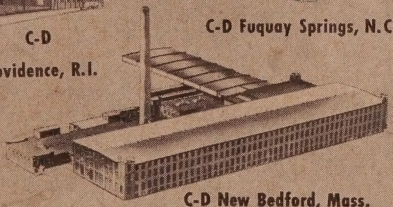

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TRANSISTORIZED HUM STETHOSCOPE

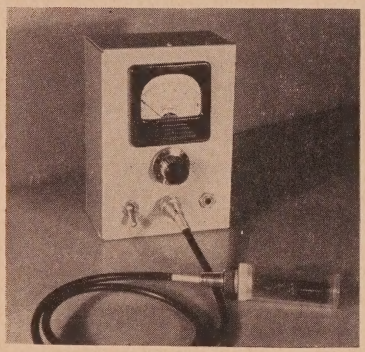

Fig. 1. Transistorized Hum Stethoscope Ready for Use. The hum probe is shown plugged into the input jack, J_1. See Figure 8 for identification of components.

The constructional details of a hum stethoscope employing battery-type tubes, self-contained A and B batteries, and an external meter were given in the April 1953 C-D CAPACITOR article. This article was unusually well received and since its publication we have had numerous requests for a transistorized version of the instrument.

A hum stethoscope must be battery-operated to insure that no hum will be generated by its own circuit. The use of transistors provides economical battery operation, reduction of the size of the instrument, and higher amplification per cubic inch of instrument space.

Applications of the hum stethoscope concern the detection and exploring of hum radiation in electronic equipment. This instrument becomes an invaluable aid to the packaging technician who must determine the best layout of components for hum reduction. Specific uses include checking the effectiveness of shields, detection of hum currents in chassis, determining the proper orientation for power transformers and chokes, and routing a-c wiring along paths of minimum interference. Supplementary applications include searching out hidden power lines, use as a sensitive a-c millivoltmeter, and locating certain types of power leaks.

The hum stethoscope circuit described in the present article has been transistorized throughout and includes a self-contained indicating meter. It is a sensitive circuit, full-scale deflection of the meter being obtained, at maximum gain, with a hum input potential of 5 millivolts rms. The complete instrument is only 7 inches high, 5 inches wide, and 3 inches deep and weighs approximately 3 pounds.

An output jack is provided for monitoring the output signal aurally or with an oscilloscope or precision external voltmeter, when this is desired. The circuit will develop a maximum output of 100 milliwatts across a 3.2-ohm load. The over-all gain is continuously variable.

Complete Circuit

Figure 2 shows the complete circuit of the stethoscope. This is seen to be a 3-stage, 4-transistor audio amplifier with an inductive input-probe and a rectifier-meter output indicator. Transformer coupling is employed throughout for maximum power gain. The first two stages are single-ended and are operated class A, while the output stage is pushpull class B.

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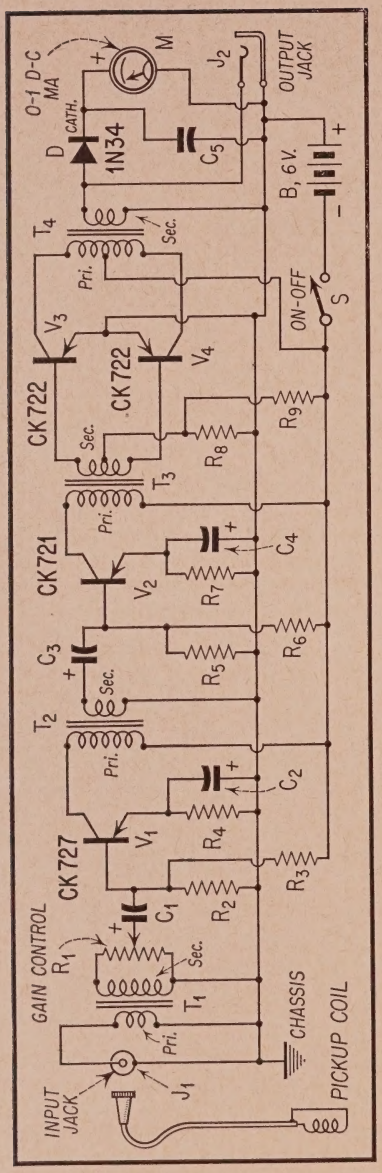


A low-noise-type transistor (CK727) is employed in the input stage, since the high gain of the amplifier demands that noise generation be kept to a minimum in this stage. High noise amplitudes would result in spurious deflection of the indicating meter. A high-alpha transistor (CK721) is employed in the second (driver) stage, and general-purpose, medium-alpha transistors (CK722) in the class-B output stage. Transistors of other types may be used only if they have electrical characteristics identical with those specified here.

D-c base bias stabilization is provided by the voltage divider networks R_2-R_3, R_5-R_6, and R_8-R_9. Emitter current-limiting resistors R_4 and R_7 are bypassed heavily by capacitors C_2 and C_4, respectively, to prevent degeneration. These measures serve to stabilize the gain of the amplifier to some extent against large variations which might arise from temperature changes and transistor replacement.

The input probe contains a small iron-cored coil for exploring the hum field. The coil used in the probe shown in this article (Figures 5, 6, and 7) is one of the magnet coils salvaged from a conventional 6-volt electric bell. If the reader desires, he may wind a suitable coil on a spool or bobbin having 1-inch separation between ¾-inch flanges, and a ⅛"-diameter, straight, soft-iron core. Wind the bobbin full of No. 28 enamelled wire (approximately 2200 turns). Improved sensitivity may result from the substitution of a high-permeability core material for the soft iron. The step-up input transformer, T_1, provides the impedance transformation required between this pickup coil and the input circuit of the first transistor.

Fig. 2. Complete Circuit of Hum Stethoscope.

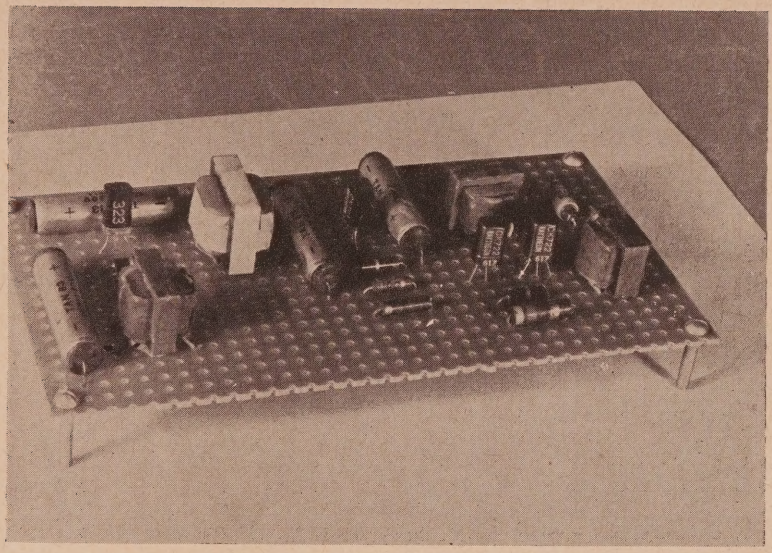


Fig. 3. Completed Circuit Board. Most of the circuit components are mounted on this 6½" x 3½" perforated phenolic board. See Figure 4 for identification of components.

The output indicator is a 0-1 d-c milliammeter, M, driven from the 3.2-ohm secondary winding of transformer T_4 through the 1N34 germanium diode, D. The open-circuit phone jack, J_2, permits external monitoring of the audio output signal. No electrical zero-setting of the meter is required.

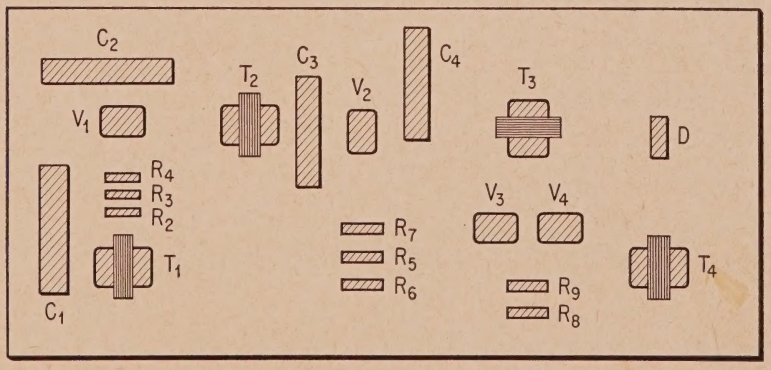


Fig. 4. Circuit Board Layout.

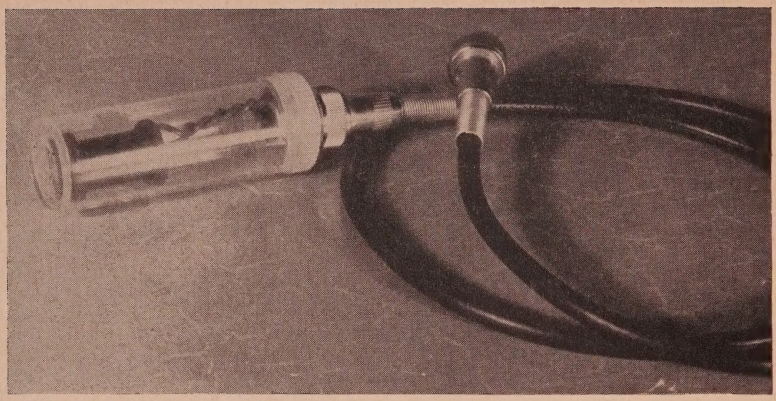


Fig. 5. Assembled Hum Probe. See Figure 7 for identification of parts.

The power output stage serves to drive the milliammeter adequately. Simpler circuit arrangements would necessitate the use of a sensitive microammeter.

The required d-c operating power is supplied by the single 6-volt battery, B, which may consist of four flashlight cells connected in series. Total zero-signal current drain is ap-

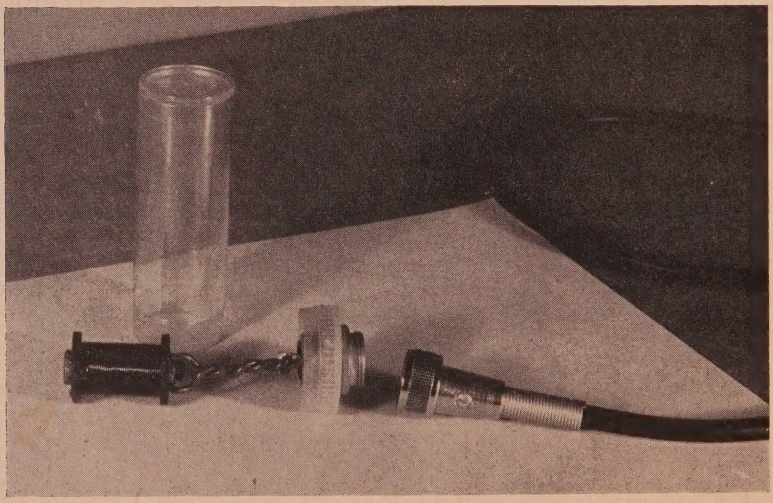


Fig. 6. Exploded View of Hum Probe. Compare with Figures 5 and 7.

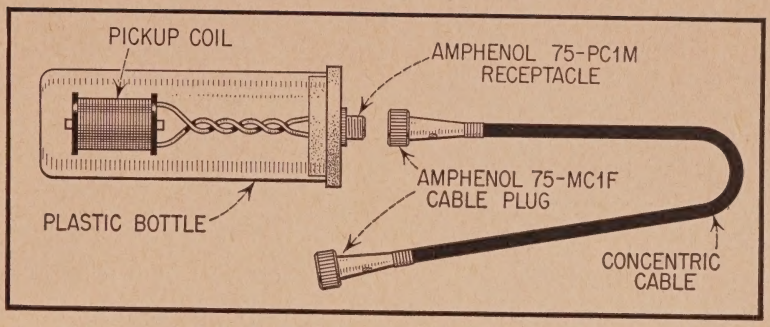


Fig. 7. Details of Hum Probe.

proximately 5 milliamperes dc. Total maximum-signal current drain (when the class-B output stage collector current swings to peak) is approximately 35 milliamperes dc.

With the gain control potentiometer, R_1, set for maximum gain, an input signal of 5 millivolts rms at input jack J_1 will deflect meter M to full scale. The over-all power gain of the amplifier circuit (from jack J_1 to jack J_2), with the amplifier terminated by 3.2 ohms resistive, is approximately 48 db. Without the input probe the circuit may be employed as a high-gain a-f amplifier with a 3-ohm input impedance, 3.2-ohm output impedance, and 100 milliwatts power output.

Construction

Figures 1, 3, 4, 5, 6, 7, and 8 show constructional details of the instrument.

The hum stethoscope is built in an aluminum chassis box, 7" high, 5" wide, and 3" deep (LMB No. 753). The over-all external appearance is shown in Figure 1 which may be compared with the layout sketch, Figure 8, for identification of the components on the front panel. Other layouts are entirely permissible.

The amplifier proper is built on a perforated phenolic board 6½" long and 3½" wide. Figures 3 and 4 show its details. This board contains all components except potentiometer R_1, jacks J_1 and J_2, battery B, switch S, meter M, and capacitor C_8. The components are mounted simply by passing their pigtails through the tiny holes of the board and bending them tightly underneath. The wiring is completed by soldering appropriate pigtails together under the board. Figure 4 identifies the components on the board. The circuit board is held to the inside back wall of the case by means of four 6-32 separating screws.

The meter bypass capacitor, C_8, is mounted on the back of the meter simply by fastening its pigtails to the terminal screws of the meter.

Figures 5, 6, and 7 show constructional details of the hum probe. The Editors' version of this accessory is made from a plastic pill bottle 1 inch in diameter and 3 inches long. A concentric receptacle (Amphenol 75-PC1M) is mounted in the cap of the bottle and connected to the pickup coil (described earlier in this article) in the bottom of the bottle which forms the nose end of the probe. After the connections are made between the receptacle and coil, the assembly may be potted by filling the bottle with a plastic potting liquid, such as Clarocast, and allowing it to harden.

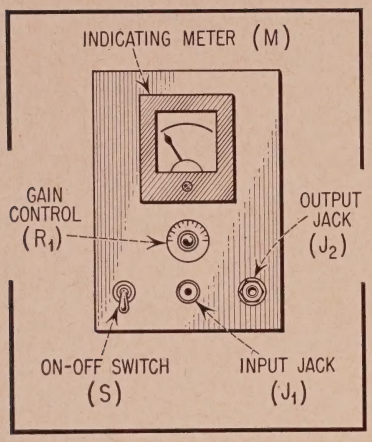


Fig. 8. Front Panel Layout.

Pill-bottle construction of the probe was employed only because this offered a simple and inexpensive method of housing the pickup coil. The resulting probe is comfortably held in the hand, easily turned about for exploration of fields, and makes a good appearance. The reader can exercise his own ingenuity in building the probe. Obviously, many satisfactory types of construction might be employed. The same remarks might be made regarding the pickup coil in the probe. There undoubtedly are more efficient arrangements than the straight core shown here, and better core materials than the soft-iron rod used in the Editors' version.

The probe is connected to the instrument by means of a 3-foot concentric cable of the highly-flexible microphone type. Each end of this cable is terminated by a plug (Amphenol 75-MC1F), one being mated with the receptacle in the end of the probe and the other with a similar receptacle (J_1) on the front panel of the instrument. The cable is shown plugged into the probe and instrument in Figure 1.

The circuit wiring is entirely straight forward. The reader must be careful, however, to observe the correct polarities of battery B, electrolytic capacitors C_1, C_2, C_3, and C_4, diode D, and meter M. More than ordinary care must be taken to insure correct connections to the transistors.

The transformers (T_1, T_2, T_3, T_4) must be mounted far enough apart to prevent undesired stray coupling between them. If, in an individual layout, the transformers must be grouped closely, they should be oriented so that their cores are at right angles. Figures 3 and 4 show a satisfactory spacing and orientation.

Initial Test

In most practical applications of the hum stethoscope, comparative indications of hum field strength will suffice. For example; in cleaning up hum in an amplifier, the gain control (R_1) of the instrument will be set for a good deflection of the meter when the probe is in the hum field. Then, as various steps are taken to reduce the hum radiation, the correspondingly lower successive readings of the meter will be compared to the original deflection. In such applications, actual magnitudes of hum voltage are not all-important, except academically, since the real goal is zero hum, and comparative readings give an adequate indication of progress in reducing the objectionable fields.

Nevertheless, if a reader desires absolute voltage indications, the instrument may be calibrated on the basis of input voltage at jack J_1, in the following manner: (1) Apply a variable-voltage, 60-cycle signal to jack J_1. (2) Connect an accurate a-c vacuum-tube voltmeter-millivoltmeter to jack J_1. (3) Close switch S and advance gain control potentiometer R_1 to its maximum-gain setting. (4) Adjust the input-signal voltage for full-scale deflection of meter M. (5)

Set the input-signal voltage to successively lower levels, recording the corresponding deflections of meter M. (6) The same procedure may be repeated at lower-gain (higher input voltage) settings of R_1. However, volume-control-type potentiometers usually cannot be re-set accurately enough to permit use of this control as a reliable range changer. A step-type potentiometer will be more satisfactory if the reader desires a series of voltage range calibrations for the instrument. The response of the indicating meter, M, is approximately square-law.

To test the instrument prior to any voltage calibration, close switch S, connect the hum probe to input jack J_1, advance the volume control potentiometer (R_1) to its maximum-gain setting, and hold the probe cautiously near a source of a-c field, such as an a-c line, power transformer, or choke coil, and note the meter deflection. Orient the probe and note any changes in deflection.

PARTS LIST FOR FIGURE 2

B—6-volt battery (4, 1½-volt flashlight cells in series)

C_1, C_2, C_3, C_4—Miniature 20 ufd, 50 v tantalum electrolytic — Cornell-Dubilier TAN 63

C_5—1 ufd, 200 v tubular — Cornell-Dubilier ST 2W1

D—General-purpose germanium diode — Raytheon 1N34

J_1—Concentric chassis receptacle — Amphenol 75-PC1M

J_2—Midget open-circuit phone jack (for 3.2 ohm SPKR.)

M—0-1 d-c milliammeter

R_1—10K wirewound potentiometer

R_2—2.2K ½ watt carbon

R_3—10K ½ watt carbon

R_4—820 ohms ½ watt carbon

R_5—2.2K ½ watt carbon

R_6—10K ½ watt carbon

R_7—820 ohms ½ watt carbon

R_8—120 ohms ½ watt carbon

R_9—4.7K ½ watt carbon

S—Spst toggle switch

T_1—Subminiature input transformer — UTC DOT-5

T_2—Subminiature interstage transformer — UTC DOT-1

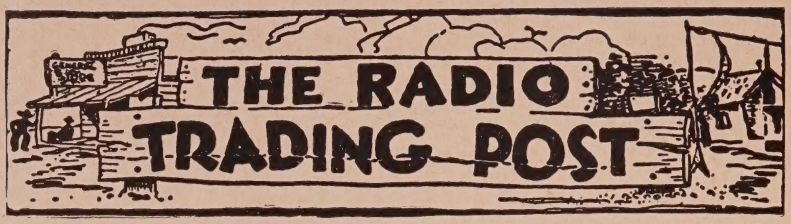
T_3—Subminiature driver transformer — UTC SO-8

T_4—Subminiature output transformer —UTC SO-9

V_1—Low-noise transistor — Raytheon CK727

V_2—High-alpha transistor — Raytheon CK721

V_3, V_4—General-purpose a-f transistors — Raytheon CK722



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WANTED — Operating manual with schematic, alignment instructions for BC-1147-A rcvr, FT and R Co., 1.5 to 30 Mc. B. L. Toy, 44 Cummings Rd., Brookline 46, Mass.

FOR SALE — VM Hi-Fi four speaker record changer, 1. n., $100; 35mm camera with F.4 lens. Will swap for 8mm movie camera. Roland Staples, Rt. 2, Box 5, Main St., Eliot, Maine.

WANTED — Old FM band radio, 44-48 Mc; also manual on alignment instructions for R-28-ARC-5 VHF rcvr, 100-156 Mc. A. M. Nohe, 246 W. 6th Ave., Huntington, W. Va.

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WANTED — Good signal tracer speaker enclosure either kit or assembled; late model preamplifier, factory assembled or unassembled kit; good tweeter. L. E. Salom, 724 Hunting Tower W., Alexandria, Va.

WANTED — AM-FM radio chassis like Espey 513 or Knight 14F490 with tuning eye, must be in good working cond. State make, model and price. John Diaz, 2239 So. Layton Blvd., Milwaukee 15, Wis.

FOR SALE — Like new Webcor 3-speed changer with crystal turnover cart., $28.50; 0-30 amp. panel meter, $1.50; Lionel train xformer with whistle and reverse controls, $3 John P. McCullen, 3050 Bainbridge Ave., Bronx 67, N. Y.

SELL OR SWAP — QST's 1932-'48 complete, $35; ARRL Handbooks; ATR inverter RHF, $35; 1. n. Shure 55 mic, $35. Bob Schill, Box 412, Hinsdale, N. H.

FOR SALE — Collins 32V-3 amateur xmitter, 1. n., $495; KW parts; test gear; manuals. Write for list. William Harden, 1827 Edgewood Ave., Norfolk 3, Va.

SELL OR TRADE — Eldico TR-75 trans, 75 w., good cond., extra set of coils for 10 meter or trade for 6 meter gear. Robert May, 203½ Althea St., Providence, R. I.

WANTED — Rek-O-Kut console cabinet model C-7, C-7B, or equal. M. J. Douglas, 1401 Amador, Concord, Calif.

SELL OR TRADE — BC 645 trans and rec. 465 Mc. Want SCR 522 trans and rec. 1st Lt., Warren H. Baily, 5617 E. 16 St. Terr., Kansas City 26, Mo.

FOR SALE — "Audio Engineering" 1948 to 1955; other audio books. J. Dunbar, 1234 16th St., Parkersburg, W. Va.

FOR SALE — Philco 70S2 dyan. Mutual cond. tube checker, l. n.; RCA WO 56A 7" scope, will sacrifice; BK500 tube checker; Riders vol. VI-VIII. Make offer. Bud's Radio and TV Service, 5912 Hampton Ave., St. Louis, Mo.

FOR SALE — Fisher 70-RT FM-AM tuner and preamp., A-1 condition, with all manuals and nearly complete set of new spare tubes, $140 cash only. R. C. Robinson, 1014 Robin Rd., N. Augusta, S. C.

FOR SALE — Hickok scope; RCP tube checker; solar condenser checker, other items. George Miller, 1723 Forbes St., Pittsburgh 19, Pa.

WANT — Heathkit T-3 signal tracer; and TC-2 tube tester, complete with schematics. State price. E. J. Durkin, 1463 Third Ave., New York 28, N. Y.

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FOR SALE — CREI lessons for swap, or reasonable deal. A. Haustein, Box 144, Atlantic Beach, N. Y.

FOR SALE — Complete Radar Electronics course in book form, $3.75. Watson, 3419 Trimble, Cincinnati 7, Ohio.

WANTED — 15 meter coils for HRO-7 and Johnson Matchbox. Cash or swap. R. J. Diehn, 3374 Blairmont Ave., Toledo 14, Ohio.

SELL OR TRADE — Hallicrafters SX62, 2 yrs. old, l. n., $200 plus freight, or trade on 8mm movie outfit or tape recorder . W. V. Bartlett, Beach Bluff Terr., Cape Elizabeth, Maine.

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FOR SALE — Heath V-7 VTVM with HV probe, test leads and instructions, $22 money order. Eugene Giroux, 735 Park Ave., Hoboken, N. J.

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WANTED — Telephone answering device and adding machine. Send complete description and lowest cash price. Pat J. Sidari, 220 N. Main St., Lodi, N. J.

WANTED — BC348 and Hallicrafters 5-10 rcvr for repair parts. Will trade parts, tubes, cash or? A. G. Fagans, 158 Jefferson Ave., Rahway, N. J.

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FOR SALE — 711 VM Tape-o-matic stereophonic tape recorder, in original carton, $130; Hi-Fi speaker in Hallicrafter bass reflex enclosure, $30. W. Sahakian, 31 Franklin St., Chelsea 50, Mass.

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FOR SALE — Heath TS2 sweep gen., $18; SG7 sig. gen., $15; V4 VTVM, $20; Eico 425 scope, $35; 221 VTVM, $20. All good cond., FOB. Frank Sabin, 4226 Decatur St., Philadelphia 36, Pa.

WANTED — VHF TV field strength meter, not UHF, in good cond. Jolly Radio and TV Service, Engelhard, N. C.

SELL OR TRADE — NRI Radio-TV course with multitester; course in book-binding, $50; Heathkit condenser checker, wired, $18; two plug-in instrument amplifiers, $20. Will trade for good tape recorder of well-known make. John Graf, 2024 14th St., Moline, Ill.

FOR SALE — Hammarlund Comet Pro short wave rcvr, good cond. Best offer over $15. Local only. John Hooper. 46 Sickles St., New York 40, N. Y.

FOR SALE — Harvey-Wells Bandmaster TBS50C complete with APS50 power supply and matching Harvey-Wells VFO in excellent all band working condx. First $100 plus shipping takes it. Jos. V. Hellmann, 65-33 78th St., Middle Village 79, N. Y.

WANTED — RCA TV not more than $50, preferably 12" or over. State cond. and details. Joseph Sugar, Jr., 1207 N. Broad, Philadelphia, Pa.

WANTED — FM tuner, Hi-Fi amplifier in l. n. cond. Charles Stouth, Box 44, King of Prussia, Pa.

FOR SALE — T-19-ARC-5 xmitter, modulator and AC power supply, TVI proofed, $35; novice xmitter built from 1954 Radio amateur's Handbook page 160, 35 w., crystal included, $20. Merlyn H. Ranney, Box 383, Athens, Ill.

SELL OR TRADE — Unused Senco BE2 TV bias supply. Want binders for Sam's Photofacts. Robert E. Redd, Box 12, Union Furnace, Ohio.

TRADE OR SELL — Webster-Chicago 80 wire recorder, $15; Hickok 550 dynamic tube checker, $20; BC923A, $20; Teletone 7" TV, $15; BC696 ARC5 unmodified, $4 each; Gordon ant. relay, $2. Want tape recorder. T. C. Fratia, Box 207, Paxton, Ill.

FOR SALE — 24 ft. magnesium ladder; Hickok 610 sig. gen., Riders Radio manuals 1 to 5 abridged and 6 to 18 inclusive; Riders TV manuals 1 to 11 inclusive. All perfect cond. Sell to highest offer, fob. B&S Radio, 191 Neptune Ave., Brooklyn 35, N. Y.

FOR SALE — Mallard 20 meter mobile converter, $5; VHF 152 10-6-2 meters converter, $20. Local area Hams only. J. J. Luczak, 608 Finley Rd., Lombard, Ill.

SELL OR TRADE — Mobile radio, Motorola P-8501-A test set, $85 or trade. Pearl River TV, 55 E. Central Ave., Pearl River, N. Y.

WANTED — Small radio in good cond. Have cash also fine man or woman's wrist watch. Levriett, 816 Broxton St., Jacksonville, Fla.

FOR SALE — Rider's 6 through 14; Sam's Photofacts 1 through 162, first 110 in binders. No reasonable offer refused. W. I. Schlosser, 903 N. Fell Ave., Normal, Ill.

SELL OR TRADE — Electro Voice mike, stand; Sam's 1-10 and Vol 2; RCP 447 tester (needs meter); old tubes; home-made 33-78 record player. Need vibrator tester, battery eliminator, signal tracer. Fred Schamu, Liverpool, N. Y.

FOR SALE — Large RCA radio-phono comb. 12 tube 5 SW bands walunt cabinet; Radiola 28 AC plus power 105 speaker, 12 tubes. Make offer. Local only. W. F. Onder, Rt. 2, Box 193, Arnold, Mo.

FOR SALE — Hammarlund HQ129X communications rcvr with speaker, excellent cond., good calibration, $100 plus postage. Wm. Gilley, 4316 McMillen Pk. Dr., Fort Wayne, Ind.

FOR SALE — K and E Planimeter, calibrated fine instrument in fitted case, English and Metric scales. H. M. Lester, 270 West End Ave., New York 23, N. Y.

SELL OR TRADE — Transvision 4-in-1, tests flybacks, yokes, CRT and Selenium rectifiers; Eico-147 sig. tracer, and 352 bar gen., factory wired, cost $110. Need instructograph with tape, code, records 78 rpm; National HFS; S40A, Sam's; Riders. John Rosol, 28 Winans Ave., Newark 3, N. J.

FOR SALE — Zenith table model standard B.C. and 2 short-wave bands, good cond., $20. Chester Ruby, 801 N. Rose St., Baltimore 5, Md.

WANTED — RCA 5786 triode; variac. Have freq. standard; 2KW rotary converter; 500 Ma. reactor; 2KVA 430-115 trans. C. Hackenson, 343 Mansfield St., Sharon, Mass.

SELL — Permo power elim. A-101, $6; RCP 322A tube tester, $11; Triplett 3" meter 200 Ma, $5; 50 mmfd 7.5 kv vacuum condenser, $4; 813's, $6. P. Bittner, 55 E. Crystal Lake Ave., Crystal Lake, Ill.

FOR SALE — Precision E200 sig. gen., excellent cond., $20. H. L. Wylie, 75 William St., Worcester 9, Mass.

FOR SALE — Millen R-9'er, coils, tube, 10-11 meters, $15, or trade for FM tuner; "Rollei Handbook," Pearlman, $3.50; "Amateur Photographer's Handbook," Sussman, $2.50; "Picture Making with Your Argus," Deschin, $1.75, all l. n. William Tietz, 1610 Mahan Ave., Bronx 61, N. Y.

WANTED — Schematic for a automatic Keyer TG-10-F, made by Gray Mfg. Co., Hartford, Conn. Stanley Gorsiski, 617 English St., Racine, Wis.

POSITION WANTED — Electronics technician, graduate of school of electricity — Radio and TV, have some experience, 26 years. Would like evening work in Pittsburgh area, prefer North side. Salary open. Stephen M. Skovran, 15 Queen St., Pittsburgh 12, Pa.

FOR SALE — Hickok 610A sweep gen., converted for marker-adder. Very good cond. Earl Aasheim, Enderlin, N. Da.

SELL OR TRADE — Central rejuvenator and tester CRT model RE-1 with manual for $30, or good VTVM with manual. L. Bylon, 244 West 116th St., Chicago 28, Ill.

FOR SALE — QST, 1949-'56; Radio-TV News, 1953-'56; G-R Experimenter, 1950-'52; Aerovox Research Worker, 1950-'56; all years inclusive, excellent cond., year or complete set only, no single copies. Best offer. R. H. Ives, R2-B32, Lynnhaven, Va.

SELL OR TRADE — C-D powercon vibrator converter, model 110RT35 — input v. 110 DC, output v. 110 AC, w. cont. 350, w. int 500, $35 or trade for 6 v. and 12 v. battery eliminator. A. W. Andreson, 2142 E. 38th St., Brooklyn 34, N. Y.

FOR SALE — SCR522 2 meter xmitter and rcvr with power supply, rack mounted, $75; complete mobile station 6 v. 20 meters, RCA commercial xmitter, with dynamotor, antenna, crystal converter, cables, $95. M. Schwartz, 166-36 24th Rd., Flushing, L. I., N. Y.

WANTED — 8BP4 and 16WP4 in good cond. good emission, no gas, etc. C. F. Albertoni, 2629 Paxton Ave, Akron 12, Ohio.

FOR SALE — Surplus capacitors, tubes, xformers, etc., at reduced prices. R. Johnson, Box 284, Fair Lawn, N. J.

FOR SALE — Heathkit scopes, 0-8 and 0-9, excellent cond.; TS2 sweep gen., other test equip. Harold Thuener, 3213 Taylor St., Schenectady 6, N. Y.

FOR SALE — Hickok test equip.; complete service lab. equip. at low prices, used very little; Riders and Sam's manuals; Lambkin frequency meter. Walter W. Bennert, 71 Bowers St., Nashua, N. H.

FOR SALE — Hamilton 22 chronometer with 48 hr. spring reserve indicator, l. n. Marine type, $75; DeVry bantam 16mm projector, built-in speaker and separate 10" speaker, $125. O. D. Fortner, 9 E. Pulaski, Shawnee, Okla.

FOR SALE — EMC 307 tube tester, A-1 cond., Heathkit Q multiplier assembled. Make offer. Clyde Ditto, Plattsburg, Mo.

SELL OR TRADE — Heathkit TC-2 tube checker, fully wired, working perfectly. Make cash offer or what have you in ham gear? Vernon H. Joy, 724 N. Taylor Ave., Oak Park, Ill

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FOR SALE — Mallory TV 101 ultra high freq. converter, $20; Masco TVB tuneable TV booster, $13; Hallicrafters rcvr S-59A, $45. All in excellent condition. H. F. Buchanan, 727 So. 35th St., Louisville 11, Ky.

WANTED — Flyback tester, condenser checker, VOM 20,000 ohms per v. AC, Sam's and Riders. Have Fundamentals of TV Engineering by Glassford. I. Rohssler, 224 York St., Brooklyn 1, N. Y.

FOR SALE OR TRADE — Antique Edison consolette phono, good cond., with box of Edison records and two reproducers (vertical and lateral). Best offer, plus freight. Some antique radios. Harold Garrett, 711 South N. Y., Sedalia, Mo.

SELL OR TRADE — Heathkit TC1 tube tester. Want VTVM, used TV, tube caddy, tubes, parts or? Louis A. Henchen, R. 3, Neillsville, Wis.

SELL OR TRADE — RCA HB-3 tube handbooks 5 volumes complete, also radio and electrical books, reasonable. List on request. James Hales, 19965 Conley, Detroit 34, Mich.

WANTED — All types of quartz crystals in holders; Sam's; Heathkit test equip. and FM tuners in any cond., panel meters all ranges for cash or trade at your option. Wood Radio and TV Service, 213 Springer Dr., Caraopolis, Pa.

FOR SALE — VFO Lysco 600 band-switching xmitter with antenna coupler, complete, l. n., $60; misc meters, tubes, and relays. Al Salzwedel, 810 Second St., LaPorte, Ind.

WANTED — RCA Victor Service Manuals 2 and 3, l. n. cond. Quote price. Albert C. Steiner, Milford, Pa.

SELL OR SWAP — Holmes 35mm portable sound projector with amp. and speaker, good cond. Best offer. J. DeMann, 1346 Woodbine St., Pittsburgh 1, Pa.

WANTED — "Pen-oscil-lite" and "Signalette" (pocket test oscillators); also "TV Dynatracer"; 1952 Ford radio. Robert Bilek, 10407 Grandview Ave., Cleveland 4, Ohio.

FOR SALE — Two WE sound heads with 7260 apertures and lens; organ manual with electrical contacts; BC 620 transreceiver; Grebe receiver; radio magazines and catalogs. John North, 140 Sheridan Blvd., Inwood L. I., N. Y.

SELL OR TRADE — 6 TV boosters, supersonic in original cartons; mast mounting Vee-DX, $7 each, or $35 for lot, or trade for scope of comparable value. Cas's Radio and TV, R 4, Crescent Rd., St. Clairsville, Ohio.

QUICK SALE — McMurdo-Silver 911 sweep gen. with built-in 1 Mc. and 5 Mc. marker with separate attenuator, $60; Sams Vols. 1 through 20, binders, $12.50 each. Jack M. Gutzeit, 75-02 168th St., Flushing 66, N. Y.

FOR SALE — Simpson 480 scope with leads and manual, $215, prepaid, Hickok 209A VTVM, $85; Sprague TO-3 condenser tester, $35; Eico 232 peak-to-peak VTVM, factory wired and calibrated, $35. Kane Radio and TV Service, 408 St. Johns Pl., Brooklyn 38, N. Y.

FOR SALE — RCA W056A 7" scope; Philco 7052 tube checker; B-K500 tube checker. Will sacrifice. B. H. Hoser, 3821 Courtois, St. Louis 23, Mo.

FOR SALE — Over 250 assorted tubes, ballasts. Most in original cartons, all guaranteed. List over $300, will sell for fraction of cost. Write for list. Leonard Polikoff, 2464 E. 21st St., Brooklyn 35, N. Y.

WANTED — Government Technical Manuals. State ones you have and price. Will pay cash or trade surplus radio and electronic parts, etc. John Skane, Halifax 1, Pa.

SELL OR TRADE — Riders 1-14, $50; Precision 915 tube checker modified, $28; TG10 keyer, $18; Meissner analyst, $40; Triplett 3434A sweep gen., $160. Want comm. mobile xmitter, and ARRL handbooks 54 to 57. John Graham, 68 Wurtsboro, N. Y.

FOR SALE — AC and AC-DC radio's, tubes, automobile radios, table model radio-phono combination. Louis A Goldstone, 1279 Sheridan Ave., Bronx 56, N. Y.

FOR SALE — 2 1953 push button auto radios for Ford, Mercury or Lincoln and 2 power suppies for Kelvin-White depth indicator or recorder, 1 12 v. and 1 32 v. system, $15 each. W. G. Wright, 123 Putnam Ave., Freeport, N. Y.

SELL OR SWAP — Globe-South 65A and S38 rec. both for $75; NC57 rec. Need power supply 3000 v. at 500 ma, and good 3" scope. Toups Radio Service, 317 W. Pine St., Crowley, La.

SELL OR SWAP — Gen Ind. single speed recording turntable and motor complete with magnetic head and phono arm, used very little, for Gonset mobile converter. Ralph Surridge, Cherry Hill Rd., Baldwin, Md.

FOR SALE — Altec-Lansing 604C 15" duplex speaker with network, mounted in electro-voice Regency Klipsch-licensed folded horn enclosure, blond, excellent cond., $180. Metropolitan area. N. Hulemark, 130 75th St., Brooklyn 9, N. Y.

WANT — Good hi-power CW rig. State details fully first letter. John Seaman, RD 2, W. Macada Rd., Bethlehem, Pa.

FOR SALE — K and E log log Vector slide rule in brown leather case, full instructions, $16 postpaid. Want instruction manual for Premier 570 sig. gen. Mrs. Barbara Piller, 451 Thieriot Ave., Bronx 72, N. Y.

FOR SALE — Sams Photofacts 112, 161, 191, 194, 217, 301, 306, 309, $1 each; Eico 630 CRT tester, $12. H. Sievers, 7818 Kipling Pkwy, Washington 28, D. C.

WANTED — Hammarlund SP200-X, SP200 or mil type long-wave model Super Pro rcvr — glass tube model acceptable. Give description, price. N. Oland, Box 212 Ronkonkoma, N. Y.

WANTED — Replacement xformer for Motorola TV chassis TS118A low voltage power supply. W. E. Rees, 190 Littlebrook Dr., Hamilton, Ohio.

FOR SALE — Back issues of Radio and TV News, Radio Electronics, and Electronic Technician magazines — new subscriptions handled at very low rates. D. Pollock, Little Silver, N. J.

FOR SALE — NC-88 World Master comm. rcvr, $75; B6-1 Heath bar gen., $10. All fob. Want RCA 3" scope. Walter E. Niemiec, 227 Fairway Drive, New Hartford, N. Y.

FOR SALE — Riders vols 1 to 16 in new cond., $75. Emanuel Troise, 107-36 105 St., Ozone Park 17, N. Y.

SWAP — Pair of 810's, 813's, 8005's or used 4-125A's for small size prop pitch motor. James E. Higgins, 307 Wayne St., Highland Park, N. J.

SELL OR SWAP — 3" Pilot TV in working cond., for stamp collection. Give full description of collection. G. A. Sterling, 6341 Sewells Pt. Rd., Norfolk 13, Va.

FOR SALE — Heathkit tube checker TC2 wired and in perfect cond., $20; multimeter Superior R55, $10; 2 Emerson portables 3-way, $8 each, and 7" Emerson portable TV, $25. J. Kramer, 229 E 7th St., New York 9, N. Y.

SELL OR TRADE — Heath CRT checker never used, $20, or trade for piston-type spray gun compressor. V. R. Valley, 4318 Banks St., New Orleans 19, La.

FOR SALE — Vol. 1 NRI service manual and Riders vols. 13 and 14, all for $25, fob. DeVoe Radio Service, 3729 Beaumont Circle, Madison, Wis.

FOR SALE — Table model 12" Westinghouse TV in working cond., $40; 15" console Raleigh TV with AM and FM radio, AM and FM band working, TV needs repair, $15, both for $50. Local. B. Zaino, 2038 Pitman Ave., New York 66, N. Y.

FOR SALE — Sprague TO-4 condenser resistor analyzer, exc. cond.; ICS course, Practical Radio Servicing, 35 texts; Cooke's Mathematics for Electricians and Radiomen. Best offer. J. W. Bernthal, 316 Vida Ave., Lemay 23, Mo.

FOR SALE — Hickok instruments: 605A tube checker, $100; 610A sweep gen., $125; 690 marker-calibrator, $150; 640 scope, $200; Radion field strength meter, $75; B&K pix tube checker-rejuvenator, $40. All new cond. Want Transoceanic C. Lind, 3561 Blanche St., Pasadena, Calif.

WANTED — Several WE728B speakers. L. A. Webb, 825 Parke's Run Lane, Villanova, Pa.

FOR SALE — Good used GI recorder phono assembly, 33-1/3 and 78 rpm with magnetic cutting head, and crystal pick-up, $15 plus postage. Austin Wardman, 106 Rossmore St., East Pittsburgh, Pa.

FOR SALE — 2 Altec 433-A pre-amplifiers, l. n., factory cartons, $50, ea. fob. R. F. Ledyard, 3 Ledyard Ave., Cazenovia, N. Y.

FOR SALE — Pair sound powered voice phones with fifty feet of heavy cable, used once, $12. Doty Radio and TV Service, 71 Rita St., Dayton 4, Ohio.

FOR SALE — AC operated instructograph, good working cond., 10 tapes and instruction booklet, $25 prepaid, or $20 COD. J. R. Chaney, Box 293, Lake Geneva, Wis.

FOR SALE — Eico 950A capacitor-resistance bridge, used only few times. Instruction book and schematic included, $15 fob. N. Liemberger, 193 Windermere Blvd., Buffalo 26, N. Y.

FOR SALE — Gonset 3-30 tuner, $25; Carter genemotor 450AS, $25; 35 w. all-band phono xmitter, $65; MM mount 132XSSC plus antenna and Hi-Q coils 20-40-75 meters, $30; complete mobile station, $167. Arne Hanson, Costa's Trailer Ct., Rt. 46, Lodi, N. J.

WANTED — Cabinets for Bendix radio 636BA, and Admiral radio 5R11-N. Forest Hill Elec. Shop, 462 Broadway, Newark 4, N. J.

SELL — BC221-AH, complete, original calibration book, $60; 6 810's, $7 each; 250 TH's, $8; 100 TH, $4; 805's, $3; 304 TL, $5, all perfect. Macy, 2440 Lake View, Chicago 14, Ill.

SELL OR SWAP — Complete NRI Radio-TV course including radio servicing, fine cond. for 7" TV or best offer over $25. Jack Sheehan, 540 W. Mendo, Willits, Calif.

SELL OR TRADE — Radio, TV tubes and parts; darkroom equipment, books. Want books and courses. Robert E. Wall, Box 141, Byars, Okla.

AVAILABLE — Radio and TV tech. and expert piano tuner with many years practical experience. L. Haskins, 304 So. Maple, Sturgis, Mich.

FOR SALE — Riders 4, 5, 6, and 7; make offer for all or any. J. O. Basham, Altamont St., Covington, Va.

WANT TO BUY — Radio or TV store with good living quarters in Tampa and St. Petersburg area, located in business district and reasonable. D. Green, Box 685, Hamilton, Ohio.

FOR SALE Doolittle FD-10A frequency meter and modulation monitor; Rek-O-Cut M-12 overhead cutter, 78 and 33-1/3 rpm; Hickok traceometer, All top cond. with instructions. John C. Gilbert, 19 Garfield St., Morgantown, W. Va.

FOR SALE — Confidence automatic "B" tube tester, good condition, $10 plus postage; CTR 103 testivator, excellent cond., $13 plus postage. Want inverter with 6 and 12 v. DC output and 4" scope, working. W. B. Jones, TV Serv., Carnesville, Ga.

FOR SALE — Precision test equipment, General Radio, Weston, others. Send for list. Emil Backstrom, Jr., 5235 North Winthrop Ave., Chicago 40, Ill.

FOR SALE — Sams Photofact folders in binders, vols. 1 through 11, excellent cond., $175 plus shipping. Joseph A. Szot, 423 Lord St., Dunkirk, N. Y.

SELL OR TRADE — Over 500 radio and TV tubes; American Beauty soldering iron 220 v. 130 w., $2.50; 78 rpm Webster record changer chassis, $10. Andrews, 740 Maple St., Bethlehem, Pa.

FOR SALE — Heath AT-1 xmitter and AR-3 rcvr, excellent cond., $60 plus shipping. John Zelenak, 129 High St., Wareham, Mass.

FOR SALE — Like new Sprague Kwik-Test KT-1 cap. checker, $21; RTTA K-7 sig. gen., needs calibration, $9. R. M. Carl, 1111 Vance Ave., Caroapolis, Pa.

WANTED — Hallicrafters SX28-A Skyrider rcvr, need not be in working order. State cond. and price. R. G. Kramer, 1406 14th St., Peru, Ill.

SELL OR TRADE — BC348Q, BC344, and BC314 army radios. Want Colt percussion revolvers, Springfield Civil War or Winchester L. A. rifles. J. Darnell, R 1, Box 341, Bristow, Okla.

WANTED — Current xformer (only) for AC ammeter for $3 plus postage. Describe fully. F. Smith, 3227 Tennyson St. N.W., Washington 15, D. C.

FOR SALE — Precision ES-500A 5" scope and probes; E-400 sweep gen. with 4.5 marker and 2000 Kc crystals; E-200C sig. gen. with probes, instruction books, $150 takes all. Lester Anthony, 11 Marginal Rd., Bloomfield, N. J.

SWAP — ES500 oscillograph with manual for Heathkit 0-11 oscillograph in kit form or partially assembled kit. S. W. Kovacs, 2906 Miles Rd., Louisville 5, Ky.

FOR SALE — Eico 950B resis.-capac. bridge, factory wired, $20; Eico 322, A-2490 sig. gen., factory aligned, $18, postpaid. John A. Komarniski, Scobey, Mont.

FOR SALE — Gonset tri-band converter, excellent cond., $25. Frank Apgar, Jr., RFD Box 69, Parsippany, N. J.

WANTED — For cash — all kinds of test equip.; 8mm sound projector. State cond. and lowest price. H. G. Radcliffe, 1013 W. High St., Petersburg, Va.

WANTED — TV serviceman experienced only. Permanent job for right man. Must have own hand tools. Test equip. and truck furnished. Must have references. Butler Electric Co., Eustis, Fla.

TRADE — Viking Ranger xmitter completely wired and tested, very good cond., for Gonset communicator 2 meters, equal cond. Also Johnson Matchbox for Heathkit 25 w. Hi-Fi amplifier W-5M. Local preferred. A. Stauch, 541 Princeton Rd., Linden, N. J.

SWAP — All types radio-TV test equip., tubes, condensers, resistors, etc., for B&L 6 x 30 or 7 x 35 binoculars, or good grade over and under shotgun. John C. Nelson, 1432 Buffalo Rd., Erie, Pa.

FOR SALE — 58 copies of Radio Electronics and Radio-TV News. All in top cond., $4 plus postage. Daniel Seidler, 4216 S. Washtenaw, Chicago 32, Ill.

SWAP — UTC LS-24, LS-50, or HA100X for LS-14, HA103A or MC-2. Robert Cobaugh, 29-29 213th St., Bayside 60, N. Y.

FO RSALE — 1/4, 1/6, and 1/8 hp electric motors, $10; Triplett 1183 SC tester, $15; preselector SW, $10; 12" TV, $10; 80-meter ARC-5 xmitter, $7.50. W. B. Soble, 6048 Alma St., Philadelphia 49, Pa.

WANTED — Service manual for aircraft transceiver. RCA model AVTR-116 or 116. Herman's Radio Service, 803 W. Locust St., Bloomington, Ill.

FOR SALE — Rider Chanalyst 11 with all test leads and instructions; Clough-Brengle sig. gen. 100 Kc to 31 Mc. Both in good working condition and reasonable. Also oil filled magnifier for small-screen TV. Walter Schofield, 33 Strand St., Fall River, Mass.

WANTED — Auto radio books, mags, factory and owner manuals. Also pay for original servicing tips, this subject. B. Davis, 79-19 68th Ave., Middle Village 79, N. Y.

SELL OR TRADE — Bell and Howell 134V 8mm movie camera, with F1.9 lens and F1.9 telephoto. Want tape recorder. R. Erbeck, 288 So. Prospect Ave, Bergenfield, N. J.

HEATHKITS FOR SALE — AT-1 35 w. xmitter, $20; DX-35 phone or CW xmitter, $45; VF-1 accurately calibrated VFO, $17; AC-1 antenna coupler, $12. All in good shape. Bill Powell, Pine Hill, Ala.

SWAP — Burroughs adding machine, Philco comb. radio-record player, Columbia 33-1/3 record player, TV parts and CRT tubes, Webcor wire recorder. Want tape recorder or poloroid camera. Karl G. Muck, RD 2, Warsaw, N. Y.

FREE — 49 copies of Popular Science Dec. 1950-Feb. 1954. Will mail all or single copies. You pay postage. H. D. Westbrooks, Box 252, Griffin, Ga.

FOR SALE — RCA 630 TV Chassis 16" CRT operating cond., $20 or best offer. L. Chernoff, 30 Dewey St., Newark 8, N. J.

SELL OR SWAP — Fuses, tubes, radio-TV parts, manuals, etc. Want 35mm silent films. Vincent Malack, 10530 Edbrooke Ave., Chicago 28, Ill.

FOR SALE — Audiosphere Stereo tape player, dual channel pre-amp. in cabinet, $49.95; 2 Mark 11 Dyna amplifier, ea. $64.50; Pentron tape recorder with VU-meter preamp, $74.50. J. C. Davis, 9014 N. Laramie Ave., Skokie, Ill.

FOR SALE — Master swivel body mount with double taper spring l. n., $3.50; 6 v. dynamotor 425 v. at .375 amp, $8.50; Mallory VP-401 vibrapack 6-220 v. with new vibrator, $6. All good cond. G. W. Carter, 8015 Loyola Blvd., Los Angeles 45, Calif.

WANTED — For cash Harvey-Wells TBS-50D xmitter. M. J. Thornhill, Hoschton, Ga.

SELL OR TRADE — RCA continuous variable speed turntable, 78 rpm record changers, RCA radios 17, 33, 46, 60; Stromberg, Atwater-Kent, other antique radios. Want Riders 21 or WE 540 AW 18" cone speaker. Gifford N. Hartwell, 38 Charlemont St., Newton Highlands, Mass.

SELL OR TRADE — Seeburg 78 rpm record changer, high frequency tubes, misc. condensers, resistors, meters, 3 10" slide rules. Want darkroom and optical equip. jointer, bandsaw, tape recorder. G. F. Levy, 4637 Clausen Ave., Western Springs, Ill.

FOR SALE — AC or mobile Vocagraph 30MP20 amplifier with record player, 115 v. AC-6 v. DC, 12" speakers, 2 split case, 2 aluminum horns, car top rack, mike, stand, cables, $150. Perfect. Riddle Radio Service, 15 George St., Milford, N. H.

FOR SALE — Coyne: Vols 3, 4, and 5 Radio and TV series and TV Encyclopedia, A-1 cond. $11 for all. Daniel Siedler, 4216 S. Washtenaw, Chicago 32, Ill.

FOR SALE — Hallicrafters SX-28 rcvr without speaker, $100; back issues Radio and TV News and IRE Proceedings. L. E. Jones, 2427 109th Ave. SE, Bellevue, Wash.

SELL OR SWAP — Lab model RCA WR-94P 12 channel crystal controlled TV and other TV's; RF sweep gen.; McMurdo-Silver 909 sweep gen.; Eico 315 deluxe gen. Want tape recorder and Hi-Fi equip. Control TV, 123 Ave. U, Brooklyn, N. Y.

FOR SALE — "Radian" field strength meter, working, $40; capacitor-resistor tester NRI 112, $20; "Electro" 6 v. power pack, $15. Reuben A. Lagman, Box 33, Viola, Idaho.

FOR SALE — Precision E200C sig. gen., $50; Hickok 203 v. DC milliammeter, $50; ATR 620C ELIR inverter, $45; RSE condenser checker, $20; Hickok 600 tube tester, $75, fob. W. M. Edwards Radio Shop, 202 East Main St., Homer, Mich.

FOR SALE — 50 assorted pots — 1 meg, 5K, 300K, 750K, 500K, and 50K — all with shafts, $10; pair 813 tubes, $6.50 each. E. Baklini, 9 Shadyside Ave., Port Washington, L. I., N. Y.

FOR SALE — Sam's Photofacts like new in hard-back binders, 17 misc numbers and 90 to 250, $175 plus freight. Frank Vano, 4351 W. 56th St., Cleveland 9, Ohio.

FOR SALE — Hallicrafters S-55 AM-FM rcvr, $25; GI R90L dual speed disc recorder and phono with extra magnetic recording head, instruction books, $15, good cond. T. F. Benewicz, 3050 Edwin Ave., Ft. Lee, N. J.

FOR SALE — Old radio parts and car and house tubes from 1926 to 1954. Send your needs. Joe M. Palmer, Box 550, R. 4, No. Wilkesboro, N. C.

FOR SALE — Sprague KT-1 condenser checker, checks while connected in circuit, l. n., $15. H. H. Seabrook, 36 Branch Ave., Freeport, N. Y.

WANTED — Oct. 1937 Radio World, old sig. gen., meters, 1 to 4" camera and projector lens, FM conver., gen., xtals. F. Cabon, 5734 Waring, Hollywood 38, Calif.

WANTED — 3" Pilot TV; GE portable model 250; Bell 3-speed tape recorder. Have Sunbeam elec. shaver, $9.50 prepaid. Harold Otis, 12328 Shoemaker Ave., Whittier, Calif.

SWAP — RCA-TV camera, ideal for closed circuit transmissions; Navy RDZ rcvr. Want Hi-Fi equip., recorder, photo gear. L. Meister, 321 River Rd.,Nutley 10, N. J.

SELL OR SWAP — RME Mc-5.3 26 and 10 meter mobile 6 v. converter, for cash or part payment toward smaller outboard motor. Al Valunas, 10 Pine St., W. Catasauqua, Pa.

FOR SALE — Used Zenith table model H72521 super-symphony AM-FM radio rcvr in excellent working cond. Best cash offer. D. Landesberg 179 Marcy Ave., Brooklyn 11, N. Y.

SWAP — RCA 19 TV model york mahogany cabinet. Swivel table working cond., and Precision Test Master, 20,000 ohms per v.; portable tube and set tester, for late typewriter; piano accordion. Thomas Byrne, 331 Calhoun Ave., Bronx 65, N. Y.

FOR SALE — Photoflash new parts; triad xformer 4 v. and 110 AC in 450 out; Cornell 4 v. vibrator; Cornell 200 mfd 450 v. condenser cost $20. Schematic included, $8. H. I. Griffiths, 39-82 65 Place, Woodside 77, L. I., N. Y.

FOR SALE — Regency UHF converter in original carton, never used. First $8 takes it. G. H. Doty, 71 Rita, Dayton, Ohio.

FOR SALE — Quanity of 48 VDC AE connector switches, 100 position with line and private wipers, good cond., $17.50 each; used wiper banks, $5 each. FOB NYC. Emil Backstrom, Jr., 5235 N. Winthrop Ave., Chicago 40, Ill.

FOR SALE — Going TV business, nets $5 to 8,000 per year. One-man operation, established 11 years with good following. Low overhead, small town living. $1500 plus inventory. Jack's Radio & TV, Bedford, Iowa.

FOR SALE — Supreme tube and set tester with prods and manual, $60; Hickok light meter, $15; radios: Zenith portable, $10; Silvertone, $10; 2 auto, $5 each; also ATR "A" eliminator, $18.50. Albert Hart, 207 N. Raymond St., Griffith, Ind.

WANTED — 20-meter 5-el. Hy-Lite Sky-Caster rotary beam antenna SC20M5, 2000 v., 500 mil power supply and 400 — 500 mil modulation xformer. Russel A. Garlin, 211 Berry St., West Pittston, Pa.

SELL OR TRADE — Millen R9'er, Variarm VFO, SX-42, Gonset tri-band, Homebrew 500 w. phone CW xmitter, 36" Bud rack, etc. Will trade for low-power commercial rig. Locals preferred. B. A. Skurnowicz, Gouldsboro, Pa.

FOR SALE — Hi-Fi equipment: Stancor xformer output, A-8054 University spkr, Diffusicone 12, and 4401 tweeter with N2B Network. Sell separately or complete group. Excellent cond. G. P. Skeahan, 964 So. Telemachus St., New Orleans 25, La.

FOR SALE — 20 x 50 binoculars with case, $50; Century TV dynatracer M. TVD-3, $5; armature and field coil tester, $12; plastic tool aprons, 50c p.p.; radio for '49 or '50 Dodge or Plymouth. All like new. Robert Gelnett, R.D. 2, Liverpool, Pa.

SALE OR TRADE — NRI courses complete with kits: Radio Servicing, Radio-TV-Communication, Professional TV Servicing, RTTA-FM-TV Servicing, and Watch-Making. Want TV sweep gen. and marker. C. R. Keller, 8100 Hillendale Rd., Baltimore 4, Md.

FOR SALE — NC-88 communications rcvr with S-meter, perfect cond., $70; Hickok portable tube tester with built-in V.O.C., Simpson VOM multitester and TV-5-B tuning unit for BC-395-E xmitter. Both like new, best offer. Gary C. Clifton, Orchard, Neb.

WANTED — Good used Blonder-Tongue antenna booster model AB. O. J. De Angelo, Box 182, Reynoldsville, Pa.

FOR SALE — Sams photofacts No. 1 to 298, in binders, 30 books in all. All for $300. Howard C. Freer, New St., Ridgefield, Conn.

FOR SALE — RCA console radio, record player, 10" TV, in working cond. No reasonable offer refused. Larry Bollettini, 611 William St., Camden 3, N. J.

SELL OR TRADE — Complete 2¼ x 3¼ Speed Graphic outfit; complete dark room equip, including contact printer and Federal enlarger. Want 2-meter communication equip. Charles R. Hout, Palestine, Ill.

FOR SALE — 1 KW phono CW xmitter, $350. Want old radio rcvrs, 1922 to 1927, well-known makes. Esmond Volz, Box 304, R 11, Mehlville 23, Mo.

WANTED — Sheldon 20CP4A picture tube, l. n., in unopened carton. Quote lowest price fob. Norwest Radio Labs., Shelby, Mont.

FOR SALE — Best offer for Presto RC-7 tape mechanism, 7½" and 15" full track, 10½" reel adapters, 3 motors, synchronous; Rek-O-Kut V 16" synchronous recording turntable, and M5-S 16" recording lathe, 105, 210, 300 lines-inch outside-in lead screws. All like new. C. Hohmann, 124 N. Madison, La Grange, Ill.

FOR SALE — Riders TV manuals 5 through 9, never used, vol. 4 used, Each $10 plus shipping. Harold Minugh, 13 N. Grand Ave., Baldwin, N. Y.

FOR SALE — National rcvr HRO-50 with coils, l. n., $350. B. W. Guidos, Box 291, Latrobe, Pa.

FOR SALE — Dumont Tele-set, RA-103, $45; Motorola 9L1 portable TV, $20. Both in very good cond. C. Endriunas, 254 W. Grand St., Elizabeth, N. J.

FOR SALE — Heathkit AR-2 rcvr, excellent cond., manual included. Make offer. S. V. Walter, 647 99th St., Niagara Falls, N. Y.

FOR SALE — Heath QF-1 Q multiplier assembled, l. n.; Hallicrafters S meter kit, list $9.50, calibrated UM and DB complete instructions. Make offer. Graham Mac Millan, 37 Sherwood Ave., Madison, N. J.

SELL OR TRADE — Sams 60 sets Vol. 1 through 6, in binders, $30 or trade for what do you offer? Campbell, Box 183, Dublin, Pa.

SELL OR TRADE — Radio parts and tubes, old radios. Want wood working equip. J. Camarata, 30 Lilac Dr., Syosset, N. Y.

FOR SALE — PE 103 with cable and connectors, practically new, $20; Eico 315 sig. gen., $25. A. L. Jeffrey, 1321 Brinton Rd., Pittsburgh 21, Pa.

WANTED — Velocity microphone, West. Elec. or RCA; up to 25 12B4 tubes. Have ham gear and some Hi-Fi equip. Clyde Dick, 111 Bridgeview Dr., San Francisco 24, Calif.

WANTED — Circuit diagram for Ferret 610 AF gen., made by Coastwise Electronics. E. E. Nelson, 4108 E. Newton, Seattle 2, Wash.

FOR SALE — Photofacts Service Manuals, 1 to 30, with 3 binders, and Feiler stethoscope TS-3A sig. tracer, both l. n. Best offer. Camille Pichet, Jr., 98 Fourth St., Auburn, Maine.

WANTED — Photofacts 172 to 249 except 194, 221, 228, and 237. State cond. and price. Roy Shetter, 224 Mackin Ave., Lancaster, Pa.

FOR SALE — Heath AT-1 xmitter with VF-1 and AC-1; KAAR KE-23A communications rcvr. Best offer or trade for Hi-Fi equip. Bernard Gordon, 85 N. Welles Ave., Kingston, Pa.

SALE OR SWAP — Photo-electric unit, $10; PE103 dyn., $10; 80-meter ARC-5 xmitter, $7.50; Triplett 650-SC output meter, $3. K. Silverstein, 6343 Eastwood St., Philadelphia 49, Pa.

SELL OR TRADE — Heathkit PX-35 xmitter and V-7A VTVM; Jackson 649 tube tester; Hallicrafter's SX-100 with 10" speaker. Want A-1 8mm movie projector. Armond Henke, Box 84, Port Townsend, Wash.

WANTED — Radio-TV repairman. Prefer experienced person or student with some experience in Radio-TV, car radios, and antenna installations. State qualifications and salary expected. Tomalinos' Radio and TV, Glendive, Mont.

WANTED — Measurements Model 80R sig. gen. State cond. and price. James V. Clark, Box 478, Granville, Ohio.

SELL — Hallicrafters T54 7" TV, needs mask, $25; Eico 1040 Eliminator, $15; Heath VTVM V6, $18; Millen 10012 angle drives, $3; SCN dial, $4.50; SO 239 or PL 259, 35c ea. All plus shipping. M. Marshall, 455 Washington Ave., Dumont, N. J.

TRADE — Radio-TV News 1945-52; Radio Craft (Radio-Electronics) 1945-52; Radio Maintenance 1946-48; others, mostly mint cond. some parts. Want Lionel standard OO or O gauge trains before 1941 or old Lionel catalogs. B. Reilly, 1730 Lurting Ave., Bronx 61, N. Y.

WANTED 10 v. Center Tap @ 10 amp Filament xformer; B&W CX-45B Butterfly condenser; National MB-40L tank circuit. Have misc parts or equip. to trade. William Firestone, 1522 Charlotte St., Bronx 60, N. Y.

SELL OR SWAP — Gonset 3-band, 3 to 30 Mc, mobile converter and Gonset mobile Clipper-Squelcher, perfect cond. Need guns; photo equip. Carl Stahnke, 5565 N. Federal Blvd., Denver 11, Colo.

SWAP — Service Instruments Co. "Sensi-Meter" valuable TV service test instrument in trade for ham VHF gear, BC-221, or? Howard L. Enstrom, R. 1, Box 663, West Chicago, Ill.

FOR SALE — 300 assorted Electrical, Electronic, Radio-TV magazines, 10c each plus postage. State preference. John Donelon, 17 Fulton St., Owego, N. Y.

SELL OR TRADE — Over 2300 power, precision, and carbon resistors, 500 mica, ceramic, paper condensers. Cash or photographic, Hi-Fi equip. J. A. Heacock, 15 Canterbury Rd., South River, N. J.

FOR SALE — UHF standard coil strips in original manufacturers boxes in the following quantities: 38-19Q, 4-19FG, 3-29Q, 9-32Q, 5-43FG, 6-23FG at $3 per set. Beach Radio, 2715 N. Water St., Corpus Christi, Tex.

FOR SALE — National HFS rcvr with separate power supply, excellent, $50; Smith-Corona adding machine 7 bank, l. n., $75; Bogan TV booster, $10; 16mm reels and cans, 75 cents each. G. D. Griffin, 322 West State St., Ithaca, N. Y.

SWAP — Heath 0-9 scope, "Modern Oscilloscopes and Their Uses" by Ruiter, and "Modern Radio Servicing" by Ghirardi for communications rcvr, factory wired. Harold Manthey, 344 Wisconsin St., Rochester 9, N. Y.

FOR SALE — Tape recorders, Hi-Fi, sound projectors — floor samples, closeouts. All latest models. Philip R. Li Calzi, Greenwich, N. J.

WANT — Will pay $2 for Tube Chart & Instructions for Triplett 1213, tube checker or for phosostat copies. John G. Filomeno, 7419 13th Ave., Brooklyn 28, N. Y.

SELL OR TRADE — Mont.-Ward 5" ball-bearing jointer, $35; mimeograph machine, $15; Ford 1950 radio, $12; Apex transistor and diode tester, $12; transistorized metal locator, $40. J. Chang, 127 Great East Neck Rd., Babylon, N. Y.

SELL OR TRADE — Automobile & refrig. hand tools, Triumph 351 multitesters, meters, transistors, misc. parts. Want scope, FM. rcvr, test equip. Roby, 2422 N. Halsted St., Chicago 14, Ill.

SELL OR TRADE — Deluxe Webster electric 50 w. paging or sound system amplifier, l. n. Make offer. 6 v. solenoid type starting and coax relays, $1.50 each. G. Carter, 8015 Loyola Blvd., Los Angeles 45, Calif.

FOR SALE — Projector unit with tube, in good working order; Riders TV manuals No. 1. A. M. Alexander, 159 Putnam St., New Haven, Conn.

FOR SALE — Used sound equipment: 2 Masco, 2 Challenger amplifiers; 9 mikes hi and low imp; 9 mike stands; 13 outdoor spkrs; line and mike xformers. List on request. Western Radio Repair Shop, 2 E. William St., Bath, N. Y.

FOR SALE — Emerson 21" TV never used, no cabinet; Pilot T-601 FM Pilotuner; Bogen PV 10 PP audio amplifiers; Jensen 15" coax speaker. All in good working cond. Carl J. Hoffmann, 781 Eighth Ave., New York 36, N. Y.

FOR SALE — Radiola 18, Crosley Gembox, Atwater-Kent 20, Edison Gem phono. Need Radio Call books. Chester Wegrynowski, 51 N. Central St., Buffalo 12, N. Y.

SELL OR SWAP — Hickok auto radio and speaker tester and 510 tube tester; Superior tube tester; Mallory vibrator tester, l. n. O. W. Bussert, L. Box 252, Chebanse, Ill.

SWAP — Unused expertly wired Heathkit TV alignment generator, TS2, for good record changer or tape recorder. Have good Pilot FM tuner, $12. Ed Kane, S.S.H., Quincy, Ill.

FOR SALE — Barker & Williamson Audio oscillator, model 200, 30 cps to 30,000 cps., l. n., $125. Daniel W. Churchill, Box 662, St. Johnsbury, Vt.

FOR SALE — Preamps: Altec A433A, $40 and Pickering 410, $70, l. n.; Regency RT700-41 TV remote control, $40; Webcor changer with GE cartridge, $20; Hallicrafter S41W rcvr, $25; Rex FM2, tuner, $15. Ira Perelle, 2475 Central Ave., Yonkers, N. Y.

WANTED — Recent NRI Electric Appliance course. H. M. Howell, RR 18, Box 17, Indianapolis 24, Ind.

FOR SALE — Oil condensers, 2 mfd-2500 v; 2 mfd-1000 v; 1 mfd-1500 v; 10 mfd-600 v; 2 mfd-600 v; 1 mfd-600 v; plus 400 assorted ½, 1 and 2 w. resistors, $9.50 total. Libby, 126 Bennett St., Port Richmond, Staten Island, N. Y.

WANTED — Kelsey press and equip. or camera and photo gear. Have GE CRO-3A scope, Sams photofacts to 100, Weston 785 industrial circuit tester; Hickok 9'' VOM. Richard B. Wearne, Bloomfield, Neb.

FOR SALE — RCA Navy rcvrs RAK-7, 15-600 Kc; RAL-7, 0.3 to 23.0 megs., 110 v. reg. power supply, cables and manuals, both for $85. M. R. Hemby, 1240 Green St., San Franciso 9, Calif.

SELL OR TRADE — Stromberg-Carlson TS10 comb. TV and FM radio, for a communication rcvr. Phila. vicinity only. Neil Wanamaker, Hotel Kesmon, Philadelphia 7, Pa.

TRADE — CD-TR-2 rotor; GI 250 tape disc recorder; Brush PL-20-16'' transcription arm; Astatic S-12-BL transcription arm; all l. n., for Exacta VX with F2.8 automatic lens. Wm. Lazovick, 128 Spring St., Passaic, N. J.

SELL OR TRADE — Like new Geiger counter ''Snooper'' 108, with batteries and booklet, $15; ultraviolet Mineralight M12 with 10 mineral samples and booklet, $20, or trade for Heath sig. tracer or linearity sig. gen. Joseph Urbanak, 316 Washington Ave., Beacon, N. Y.

WANTED — Simpson model 415 or 415A, RF signal generator. Dean's TV, 215 West A St., Ontario, Calif.

WANTED — Antenna tuning unit for H7-4B (BC-610) Hallicrafters xmitter. Give details. J. O. Proctor, 3 E. 25th St., Baltimore 18, Md.

WANTED — 7'' Hallicrafter or National TV, in metal cabinet. Cash or swap Triplett 1181-E analyzer. J. Karr, 1913 W. Armitage Ave., Chicago 22, Ill.

FOR SALE — Pioneer genemotor, 6 v. DC input, 300 v. at .020 amp, or 250 v. at .040 amp output. Good cond., $10. Art's Radio and TV Service, Hardy, Ark.

FOR SALE — 200B Variac 1.5 amps, $8; Superior 1126 powerstat 15 amp, $35; T85 APT-5 radar trans. without lighthouse tube, $25. Walter Zinsmeister, 146 N. 16th St., Bloomfield, N. J.

FOR SALE — Best offer: Hallicrafters SX-16 Super Skyrider rcvr, 11 tubes, 6 bands, 1000-point calib. bandspread with matching PM speaker, schematic and other data. Excellent cond., fine performer. W. D. Edwards, Box 358, Pearisburg, Va.

WANTED — Recording head or diamond point needle for Edison disc phono.; old Edisons both disc and cylinder. L. H. Francis, 401 Main St., Parkville, Mo.

WANTED — Diagram or manual for RCA rcvr M1-7603-A, 30-41 MEG VHF; also any type mobile crystal units 30-50 crystal freq. State price. R. Westfall, Underwood Trailer Pk., Rt. 88, Portland, Me.

FOR SALE — VHF boosters, $3.50 each; l. n. UHF strips, 30R, 61R, 55K, 61K, 61F-G, 55F-G, $3 each. Bill's Electronic Lab., 94½ Main St., Chicopee Falls, Mass.

FOR SALE — DX-100, xmitter grid blocked keying, heavy duty plate tank coil, perfect cond., $220; HQ-140X receiver, perfect, $220. Both $420. L. Berandt, 416 S. Davison St., Davison, Mich.

SELL OR SWAP — Three TV boosters (Anchor, Videon & Astatic) good cond. Best offer within reason, or swap for TV test equip., TV books, manuals. Robert A. Mitchem, 5325 Oak Hill Rd., Evansville, Ind.

FOR SALE — Sams fotofacts 1 to 23, excellent cond., $200; Eico 950-K R-C Bridge kit in original carton, $15. Kane Radio and TV Service, 408 St. Johns Pl., Brooklyn 38, N. Y.

FOR SALE — Riders 1 through 16 and 19; Hallicrafters S-20-R; GE 260 portable; Eicor tape recorder, excellent; Policalarm PR-7, excellent Hickok 288-X generator, l. n. Best offers. Art Fisher, 457 N. 13th St., Laramie, Wyo.

SELL — RCA TV course, 43 lessons, $40; Riders Encyclopedia on Scopes, $6; Coyne's Applied Practical Radio — TV, 5 vols., $7. All l. n., shipped fob. C. Hume, 221 S. Bonair, Youngstown 9, Ohio.

FOR SALE — RCA 813 tubes, $7.50; 810's, $7.50; 832A's, $3.50; 100TH's, $4.50; Bendix TA-12C xmitter, unmodified, $35; Measurements Corps SG-61U, l. n., $85. Bill Slep, Ellenton, Fla.

WANTED — Amplifier 110 v. and 6 v., 45 rpm phono, disc or tape recorder; 150-172 Mc rcvr; 6 v. to 110 v. inverter; 16mm projector for cash. Krzak, 65 Main, Pawtucket, R. I.

WANTED — Collins 75A1, 75A2, or 75A3. Prefer with mechanical filters esp 800 cycle; also Viking ranger. State cond. and price. P. Bittner, 55 E. Crystal Lake Ave., Crystal Lakes, Ill.

FOR SALE — Brown duplex recorder, with dual ranges of .1, 1, 5, 10, 20 v. full scale. Enclosed in metal and glass, excellent cond. $150 fob Pelham N. Y. Emil Backstrom Jr., 5235 North Winthrop Ave., Chicago 40, Ill.

EXCHANGE — Will do first class Printing in exchange for tubes, test equipment, antennas, rotors, 300-ohm lead in, solder gun, phonos, Hallicrafter radio. E. G. Bartlett, Box 134, Atlanta, Mo.

FOR SALE — Two unused replacement meters for McMurdo-Silver Vomax, $5.50 each postpaid; also 50 rotary switches, $10 for lot. L. Cohen, 151-09 34th Ave., Flushing 54, N. Y.

TRADE — Used PR4-125A for small xmitting condensers, 80 meter xtals, beam rotator. What have you? Cecil Van Buren, 439 Bracker St., Twin Falls, Idaho.

FOR SALE — Radio and TV servicing equip. and parts; Sam's and Rider's Manuals. Don Aden, 414 North 39th St., Omaha, Neb.

FOR SALE — Transvistion 21" TV with or without small tubes; 21" TV set put together through DeVry Technical Inst. Both unused and without cabinet. Best offer. Merl Eggert, Port Hope, Mich.

SELL OR TRADE — BC 659 transceiver complete with 6 v. power supply, mike, some spare tubes. Want small scope, tube tester or sig. gen. Make cash offer or what have you? Walter J. Roberts, 4307 Evans Ave., Oakland 2, Calif.

WANTED — Good communications rcvr. State make and price. John Laflie, 6146 S. Kenneth Ave., Chicago 29, Ill.

WANTED — TS-323UR frequency meter with calibration book. State cond. and price. John Christy, 14553 Dickens St., Sherman Oaks, Calif.

HELP WANTED — Ham-Radio camp counselor: over 20, experienced, general license required for co-ed summer camp. Full resume to Stissing Lake Camps, 70 Stratton Rd., Scarsdale, N. Y.

SELL OR TRADE — 500 w. modulation xformer. Need electronic key with monitor; TR-switch, coaxial switch, or? Bill Grebe, 518 West 9th, Loveland, Colo.

TRADE — Bell and Howell 120 model F 850 w. sound projector, for pair of FCC aproved Citizens band transceivers, 465 Mc. class B. Don Howard, Sherwood, Mich.

WANTED — 36" model sailboat. Have FM tuner, audio equipment or cash. Theodore Nadeje, 5101-AA 39th Ave., Sunnyside 4, N. Y.

SELL OR TRADE — Heathkit vacuum tube meter and grid dip meter, Supreme sig. gen., Meissner analyst, 2" scope, hi-power xmitter. Want 16mm sound projector in A-1 cond. Fred W. Rudolph, Box 115, Stryker, Ohio.

SELL OR SWAP — Burke and James 4 x 5 press camera, complete with flash, case, $75; or what have you? M. L. Bardfield, 4 Brinsley St., Dorchester 21, Mass.

SELL OR SWAP — Eico 360 TV sweep generator, $20; Heath S1 electronic switch, $20. Want Heath grid dip meter or capacitor checker. Local preferred. Martin A. Weiner, 2927 Holland Ave., Bronx 67, N. Y.

SELL OR SWAP — Proceedings of IRE from Nov. '47 to Sept. '55. Harry Kahn, 472 Kuehnis Dr., Campbell, Calif.

WANTED — Set of coils for R5-ARN7 radio compass. Must be complete. R. Fannon 134 Highland St., Marlboro, Mass.

WANTED — UTC output xformer LS-6L1, Dynaco A-440, Chicago BO-14, Acrosound TO-330. C. Borysevich, 1066 President St., Brooklyn 25. N. Y.

WANTED — Heathkit, test equip.; AM-FM preamplifiers, kit or built. Ed Tanrath, 2110 Broadway, Rockford, Ill.

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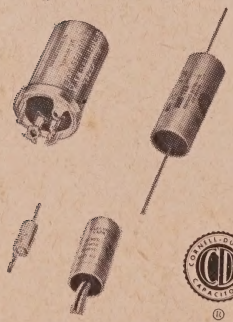

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